

Exports, Education, and Growth in Malaysia

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Abstract

This paper examines the causal link between exports and education expenditure in Malaysia's economic development using the cointegration technique, VECM and Granger causality test. The results suggest that the variables: GDP, exports, and education expenditure are cointegrated. The estimated long-run relationship shows that both exports and education expenditure could explain the variation in real GDP where both are significant at one percent level. The Granger causality test indicates that both the exports and education expenditure cause economic growth where it is significant at one percent level. These imply that the Malaysian export-oriented and education development strategy have played a very important role in the development of Malaysian economy.

Keywords: Exports, education, growth, causality

INTRODUCTION

Malaysia, as an open economy, has been very much dependent on foreign trade to achieve its economic development goals. Foreign trade has contributed a significant portion to its gross domestic product (GDP) in the last three decades, indicating that international trade has been playing an important role in the development of Malaysian economy. The share of merchandise trade in GDP was 73% in 1970, increased to 172% in 1995, increased further to 202% in 2000, and slightly declined to 186 percent in 2005. If we take the share of the merchandise trade in GDP as an indicator of trade liberalization, Malaysia certainly has gone through a relatively rapid process of trade liberalization and globalization. Thus, it has become the major objective of this paper to see whether these exports have had contributed to the relatively rapid growth of Malaysian economy. In particular, the decision made by Malaysia to implement the export-oriented development strategy beginning in 1980s has been the major vehicle that has transformed Malaysia from the primary commodity based economy to a more industrial based economy. As a result, Malaysia recorded an average of 8 percent economic growth for about nine years prior to the 1997 East Asian financial crisis. But after the financial crisis Malaysia has not been able to register economic growth beyond 6 percent.

The paper begins with an introductory remark, followed by a discussion on the Malaysian export-oriented development strategy, education and development. The third section deals with a brief discussion on Malaysian education system, followed by a literature review on the issue of

whether exports and education cause economic growth, followed by sections on the methodology, empirical results and finally the conclusion.

EXPORT- ORIENTED DEVELOPMENT

Malaysia began to pursue an import substitution development strategy in 1960s and gradually moved toward an export-oriented industrialization strategy in 1970s. Malaysia has also been aggressively pursuing the second round import substitution strategy since 1980s through its Heavy Industries Corporation of Malaysia with full government backing as a means to develop the heavy industries such as the locally manufactured car, cement, and steel industries. The shift in emphasis from the import substitution to the export promotion was prompted by the saturation of the domestic market as well as the resultant creation of unbalanced regional development in the domestic economy. This was particularly relevant as most of the import substitution industries were concentrated in the periphery of major towns, where the market of the products were located, and therefore there was a serious migration of population from the rural to the urban areas. Furthermore, import substitution industries were under high tariffs and non-tariff protection which encouraged them to be very complacent, inefficient and also lack of linkages with the other sectors of domestic economy since they normally relied heavily on the imported inputs.

Singer and Alizadeh (1988:72) argue that the import substitution and export-oriented development strategies are complementary since the export-oriented industrialization may lead to the creation of more import substitution industries as a means to reduce the import content of the exports and increase linkages from the export sector with the rest of the domestic economy. This would result in the dispersal of the manufacturing industries which has been happening in Malaysia where the export-oriented industries exist along the import substitution industries, including the second-round import substitution industries. Recently the focus of the industrialisation strategy is on the export-oriented industries, but ultimately even the import substitution industries have to export their products as the domestic market is small in terms of purchasing power and population size.

There has been a tremendous increase in the Malaysia's exports during the 1970 – 2000 periods. Malaysian total exports in 1970 were at RM5263 million which increased further to RM28172 million in 1980 growing at an annual rate of 43.5 percent. In 1990 the total exports was RM79646 million registering an increase of 18.3 percent per year during the 1980-1990 period. There was a resurgence of Malaysia exports in 2000 at RM373,270 million giving a growth rate of 36.7 percent in 1990-2000 period. Most of the exports went to ASEAN and the US, followed by EU and Japan. They accounted for 76% of Malaysian exports in 1970 declined to 70% in 2000, and declined further to 55.6 percent in 2006 indicating that the Malaysian export market has become more diversified..

In 1970 ASEAN imported 25% of Malaysian exports, the EU market at 20%, Japan at 18%, the US at 13%, and the East Asian market at only 6%. In 1990, ASEAN still remained the biggest market for Malaysia's exports which accounted for 29% of total exports. However, most of our exports to ASEAN are destined to Singapore. The US was in second position at 17%, followed by the EU at 15%, Japan at 16 percent and East Asia at 12%. The importance, in terms

of export shares, of the US, ASEAN and East Asia as Malaysian export markets had improved over the 1971-93 period while that of the EU declined from 20% in 1970 to 14% in 2000 and similarly the exports to Japan declined from 18% in 1970 to 14% in 2000. By 1990s, East Asia became one of the major Malaysian exports markets where its share of Malaysian exports increased from a merely 6 percent in 1970 to more than 15 percent in 2000.

By country, Singapore, Japan and the US are Malaysian major export markets. They together accounted for 53% of Malaysia's exports in 1970. In 2000, they continued to account for more than 52% of Malaysian exports. Singapore was Malaysian largest export market in 1970 and remained so in 1993, accounting for about 22% of the exports. Japan was our second largest export market in 1970; however, the position was overtaken by the US in the 1990s. In 2000 the USA import was the major importer at 21%, Singapore at 18%, Japan at 13% but their shares had declined to 18.8 percent, 8.9 percent, and 8.9 percent in 2006 respectively .

The structure of Malaysian exports has changed substantially. In 1970s and 1980s, most of the exports were in the form of raw materials: inedible crude materials, mineral fuels, and lubricants which had decreased from 61 percent in 1970 to 57 percent in 1980. By 1990 these exports accounted for only 33 percent of the total exports while the exports of manufactured goods had begun to emerge when its share increased from 26 percent in 1970 to 55 percent in 1990. The contribution of the inedible crude materials, mineral fuels, and lubricants fell to merely 12 percent in 2000 while that of manufactured products increased to 82 percent. Although the manufactured exports have increased substantially, it has some major weaknesses in terms of its composition. Specifically, most of the manufactured exports have been in the form of intermediate manufactured goods where their shares increased from 23 percent in 1970 to 49 percent in 2000. The exports of machinery and transport equipment increased from 2 percent in 1970 to 25 percent in 2000. Malaysian exports of final manufactured goods is still relatively small contributing only 8 percent of the total exports in 2000. The changes in the structure of Malaysian exports have been due to the deliberate government policy to industrialize and develop the domestic economy through the export-oriented development strategy since 1980s by diversifying and intensifying the export base and at the same time focusing on manufactured exports.

EDUCATION AND DEVELOPMENT

Malaysia is committed to improve the level of education as it recognizes that education is an important ingredient in development. Malaysia's education system provides free education to students between the ages of 7 to 17 for a total of 11 years of universal education. Admission age to the first year of primary schooling is usually seven and the graduating age for a first bachelor degree is about 22 years old. The children of low-income families would also get free textbooks loaned by the government. The qualities of education, access, and opportunities have improved to all strata of the society to provide manpower requirement to the nation. Yet despite the high priority given to education and the efforts made by Malaysia to ensure that the poor also have access to education, there are still some concerns that differences are growing between urban and rural areas, in terms of quality.

In 1980, primary education has a total enrolment of 2.0 million which increased to 3.0 million in 2005 (Table 1). Correspondingly, the secondary school enrollment also increased from 1.05 million in 1980 to 2.093 million in 2005. There has been a marked increase in the enrollment in tertiary education from 36,809 to 731,698 in 1980 and 2005 respectively. The private sector has also begun to play more role in education and training, as education is an important ingredient for socio-economic development of a community. In order to provide quality education comparable to that available in the urban areas, Malaysia has built more residential schools in the rural areas so that the rural students would be at par with their urban counterparts to address both absolute and relative poverty problems.

During the 1970 - 2005 period, there was a rapid expansion in tertiary education to overcome the shortage in high and middle level manpower. In 1970, there were only two public universities which increased to five in 1975, and now we have 22 public universities, five private universities, and a number of university colleges. As a result, those who were unable to enter the public universities would continue their higher education in private colleges. The enrollment in the degree programs in the public universities increased 21,000 in 1980 to 368,437 in 2005.

The facilities and courses at the college level have also expanded as a step to increase the middle level manpower. But the degree programs at the university level were biased toward arts and humanities which resulted in the shortage of manpower in the scientific and technical fields. To increase the skilled and semi-skilled manpower, the public sector had also expanded its training programs in the areas of vocational, technical, industrial, and agriculture. The private sector was asked by the government to provide the on-the-job training programs for their employees. Malaysia has also liberalized its education policy to open access education to the public. Since the places in the public higher education institutions were still limited, the government approved the establishment and operations of private colleges in the form of twinning programs of local private colleges with local and foreign universities, branch campuses of foreign universities, and also allowed the establishment of local private universities in an effort to improve human resource development, productivity, and competitiveness. As the cost of education was getting more expensive, Malaysia established a higher education fund to extend financial support in the form of education loans to students pursuing higher education in the public and private universities, including the private colleges.

Table 1. Student Enrolment

Level of Education	1980	1990	2000	2005
Pre-school	n.a.	188,840	539,469	702, 897
Primary	2,008,587	2,447,210	2,907,123	3,044,977
Secondary	1,059,954	1,312,420	1,964,607	2,093,847
Lower Secondary	812,065	943,920	1,256,772	1,330,229
Upper Secondary	247,889	368,500	707,835	763,618
Post-secondary	29,484	75,140	94,544	199,636

Teacher Education	13,247	21,580	34,672	45,899
Tertiary Education	36,809	97,190	574,421	731,698
Certificate	2,603	9,180	105,570	132,880
Diploma	12,262	28,000	208,454	230,381
Degree	21,944	60,010	260,397	368,437
TOTAL	3,150,095	4,142,380	6,103,904	6,807,727

Source: Malaysia Plan (various issues)

The future of Malaysia's economic development depends largely on the manufacturing and services sectors. As these two sectors are more information, skilled, and knowledge based, Malaysia has developed a strategic planning in education to supply the required skilled labour force and that the labour market should be more efficient in transmitting information to reduce skill mismatches, improve labour mobility, and labour market rigidities.

REVIEW OF LITERATURE

The hypothesis of export-led growth postulates that export growth is an important determinant of production and employment growth of an economy. It is argued that the export growth, through its foreign trade multiplier effect, results in an expansion of production and employment. Furthermore, the foreign exchange earnings generated by the export expansion can be then utilized to import more capital goods to help increase the domestic production capacity. The production and export expansion will allow the exportable sector to experience economies of scale and the use of more efficient technology. All these suggest that there exist causal relationships between exports and economic growth.

Empirical studies on the export growth and economic growth relationship uses either country cross-section data or time series data for a single country such as Jung and Marshall(1985) and Marin(1992). Country cross-sections studies tend to suggest that there is a strong relationship between economic and export growth rates. There are three possible relationships between exports and economic growth could be examined, namely the export-led growth, growth-driven exports, and the two-way causal relationships, termed as feedback. Studies on export-led growth by Michaely (1977), Feder(1982), Marin(1992), Thornton(1996) suggest that countries exporting a large proportion of their output tend to grow faster than others. The export expansion results in production expansion and therefore has the ability to create spin-off effects with the other sectors of the economy through the technological spillovers and other externalities. Models by Grossman and Helpman(1991), Rivera-Batiz and Romer(1991), Romer(1990) suggest that the expansion of international trade increases the number of specialized inputs which then causes economic growth as the domestic economies become more open to international trade.

A number of economists question the export-led growth hypothesis. Specifically, Bhagwati (1988) argues that an increase in economic growth may also lead to trade expansion. Furthermore an increase in exports could be due to the reduced in protectionism. Thus, there is a

possibility of a two-way causal relationship between growth and trade. Bhagwati(1988) argues that an increase in trade produces more income which then facilitates more trade. This possibility has also been pointed out by Grossman and Helpman (1991) in their models of north-south trade. Before the financial crisis of 1997, the Malaysian economy grew quite rapidly and some argue that that was because of the success of the Malaysian export-oriented development strategy. But studies on the export-led growth(ELG) suggest mixed results on Malaysia. Dodaro(1993) finds that export growth has contributed negatively to the Malaysian economic development. But to the contrary, Doraisamy(1996) finds a bidirectional causality between export growth and economic development. A recent study by Yousif(1999) supports the ELG hypothesis.

New economic growth theory recognizes the importance of human capital in explaining economic growth. Lucas (1993) argues that the main engine of growth is the accumulation of human capital or knowledge and the main source of differences in living standards among nations is the difference in human capital while the physical capital plays a subsidiary role. The new growth theory has improved the weaknesses of the neoclassical growth model by allowing increasing returns to scale through endogenous technological progress linked to human capital accumulation.

The development of human capital depends on a strong foundation of an education system. Education benefits the individual worker directly and has positive spill-over effects for society in terms of increased productivity, higher rates of innovation and invention, and adaptation of new technologies. Human capital accumulation has been analytically identified as an important potential engine of long-run economic growth since the work of Lucas (1988). In many countries, including Malaysia, government plays an important role in human capital accumulation by providing funds for formal schooling. A number of studies have been done to formalize the relationship between government education spending and growth by building endogenous growth models where public education expenditures directly influence human capital accumulation and consequently affect long-run growth.

Vidal & Bruninger (2000) examine interactions between education policy and growth. The analysis is carried out with two types of individuals: skilled and unskilled. They find that an increase in public education reduces private costs of education, increases the proportion of skilled individuals, and tends to promote growth. But education spending crowds out physical capital and reduces learning-by-doing. A marginal increase in the education subsidy can lower growth. It is also shown that pure public education maximizes the long-run growth rate. Importantly, a partial subsidy to education can result in lower growth than pure private education.

In our study, we shall incorporate public education spending as one of the explanatory variables in the growth model as suggested in the literature. Specifically, Blankenau, Simpson and Tomljanovich (2007) examine the links between public education expenditures and long-run growth. They develop a theoretical model and derive a specific growth equation to be estimated. The results suggest that there exists a positive relationship between public education expenditures and growth for developed countries.

METHODOLOGY

In this study we shall examine the issue as to whether exports and education cause economic growth or economic growth causes exports and education or whether a bidirectional relationship exists between export growth, education spending and economic growth should be verified empirically. The model specification and the techniques used will be discussed in the following sections.

The Model

This study uses a simple model specified as

$$Y_t = \alpha_0 + \beta X_t + \theta GE_t + u_t \quad (1)$$

where Y is the real GDP, X is exports, and GE is the government expenditure on education. All the variables are in log transformed. Following Engle and Granger (1987), equation (1) is written in the error-correction model (ECM) as:

$$\Delta Z_t = \alpha_0 + \lambda ECT_{t-1} + \sum_{j=1}^k \beta_j \Delta Y_{t-j} + \sum_{j=1}^k \theta_j \Delta X_{t-j} + \sum_{j=1}^k \delta_j \Delta GE_{t-j} + \varepsilon_t \quad (2)$$

where $Z = \{Y, X, GE\}'$, Δ is the first-difference operator, Y is the domestic(Malaysia) income, X is the Malaysian exports, GE is the Malaysian expenditure on education, k represents the number of lags of the explanatory variables, ECT is the error-correction term generated from the Johansen multivariate process and ε is the disturbance term. The t-test is used to ascertain the significance of the variables in the short-run.

Estimation Techniques

In order to test for the existence of a long-run or trend relationship among real GDP, education expenditure, and exports, the cointegration approach developed by Engle and Granger(1987), and Johansen(1988) is employed in this study.

Unit Root Tests. This study begins by analysing the integration properties of the data. In order to investigate the stationarity properties of the data, a univariate analysis of each of the time series: real GDP, exports, and education represented by real education expenditure is carried out by testing for the presence of a unit root using the familiar Augmented Dickey-Fuller (ADF) test (Dickey and Fuller,1979) and Phillips-Peron test, Phillips and Perron (1988). If the variables have unit roots, then the likelihood ratio test is used to find out the number of cointegrating vectors. Therefore, if there is one or more than one co-integrating vectors, then there exist the long-run combination among the variables, even though they may drift apart in the short run.

Johansen's multivariate cointegration test. We shall employ the Johansen (1988) and Johansen and Juselius (1990) approach to test the cointegration among the variables in the model. If the variables are cointegrated, the the error-correction model (ECM) will be estimated to

investigate the long-run and short-run dynamic relationships of the variables in the model. The error-correction terms (ECTs) are derived from the cointegrating vectors found through Johansen's multivariate cointegration test procedure. The ECM is then used to test Granger causality.

Sources of Data

This study uses annual data from 1965-2006 as lower frequency data on GDP are not available prior to 1990. The data were collected from the Monthly Bulletin of Bank Negara Malaysia, Quarterly Bulletin of Bank Negara Malaysia, and International Financial Statistics, IMF.

EMPIRICAL RESULTS AND DISCUSSION

In this section we shall discuss the results of the tests on unit root, cointegration, and Granger-causality. The lags for the unit root test are set to 5. The lag length for the ADF tests was selected to ensure that the residuals are white noise.

Unit Root Tests

The estimated ADF and PP statistics against the corresponding critical values reveal that the null hypothesis of unit root of the variables on level is accepted at the 5% level of significance (the details are not reported here). This implies that the variables are non-stationary on levels. But the ADF and PP tests using the first difference of the variables indicate that these test-statistics are individually significant at the 1% level suggesting that the variables are stationary on first difference and therefore each of the series is integrated of order one.

Cointegration Test

The results of the Johansen cointegration test and the normalized estimates of the eigenvectors are reported in Table 2. The lag length of the level VAR system is 5 as determined by minimizing the Akaike Information Criterion, AIC. The null hypotheses of non-cointegration are rejected at 5 percent level, suggesting that at least one cointegrating vector exists.

The cointegration equation suggests that both the exports and education expenditure influence Malaysian income per capita in the long run where they are significant at 1 percent level. Both the exports and education expenditure show the correct signs.

Table 2. Johansen's Test for the Number of Co-integrating Vectors
with 4 lags

Null	Trace			Maximal Eigenvalue		
	Statistic	5% critical value	Prob.**	Statistic	5% critical value	Prob.**

Model I: Only per capita GDP is in real terms

$r = 0$	50.155 *	24.276	0.000	43.699*		17.797	0.000
$r \leq 1$	6.456	12.321	0.383	6.454	11.225	0.300	
$r \leq 2$	0.002	4.129	0.968	0.002	4.129	0.968	

$$\text{Co-integration Equation : } YPCR = 0.0388 \text{ XN} + 0.0103 \text{ GEPCN}$$

(0.0027) (0.0006)

Model II(All variables are Nominal terms)

$r = 0$	42.424 *	24.276	0.000	25.237*		17.797	0.003
$r \leq 1$	17.188	12.321	0.007	13.626	11.225	0.018	
$r \leq 2$	3.561	4.129	0.070	3.561	4.129	0.070	

$$\text{Co-integration Equation: } YPCN = 0.5197 \text{ XN} + 0.2706 \text{ GEPCN}$$

(0.0228) (0.0054)

Model III(Only exports in nominal terms)

$r = 0$	59.351 *	24.276	0.000	48.932*		17.797	0.000
$r \leq 1$	10.419	12.321	0.1020	10.399	11.225	0.069	
$r \leq 2$	0.020	4.129	0.9070	0.020	4.129	0.908	

$$\text{Co-integration Equation: } YPCR = 0.0237 \text{ XN} + 0.0180 \text{ GEPCR}$$

(0.0011) (0.0007)

Notes: * significant at 5 % level; ** MacKinnon-Haug-Michelis(1999) p-values, figures in parentheses are the standard errors, YPCR = real GDP per capita, XN= nominal exports, GEPCN = nominal education expenditure per capita, YPCN = nominal GDP per capita, GEPCR= real public education expenditure per capita.

CAUSALITY TESTS

The VECM Granger causality test suggests that both exports and education expenditure cause real economic growth in Malaysia where they are significant at 1 percent level and the causality is unidirectional (Table 3). Feedback occurs in model II where the specification of the model is in nominal terms.

Table 3. .Granger Causality Tests

Model I	Wald Statistics			
	YPCR ^a	XN ^a	GEPCN ^a	ECT ^a
YPCR	-	17.764 (0.003)	35.438 (0.000)	2.9543 (0.5655)
XN	3.092 (0.686)	-	4.005 (0.549)	6.4863 (0.1657)
GEPCN	5.435	2.886	-	-0.1097

	(0.365)	(0.717)		(-1.6857)
Model II	YPCN ^a	XN ^a	GEPCN ^a	ECT ^a
YPCN	-	56.760 (0.003)	22.323 (0.000)	2.9543 (0.5655)
XN	72.509 (0.000)	-	11.523 (0.0042)	6.4863 (0.1657)
GEPCN	0.833 (0.975)	0.922 (0.969)	-	-0.1097 (-1.6857)
Model III	YPCR ^a	XN ^a	GEPCR ^a	ECT ^a
YPCR	-	31.761 (0.000)	35.805 (0.000)	- 2.9543 (0.5655)
XR	5.025 (0.413)	-	3.526 (0.619)	6.4863 (0.1657)
GEPCR	5.755 (0.331)	30.692 (0.689)	-	-0.1097 (-1.6857)

Note: ^a The values in parentheses are the probabilities. ^b The values in parentheses are the t-statistics.

CONCLUSION

This paper analyses the relationship and the role of exports and public education expenditure in Malaysian economic development using the co-integration technique, VECM and Granger causality test. The results suggest that the variables: real GDP growth, export growth, and the growth in education expenditure are co-integrated. The estimated cointegrating equations show that both exports and education expenditure could explain the variation in economic growth in the long-run where they are significant at one percent level. The Granger causality test indicates that both the exports and education spending cause economic growth where it is significant at one percent level. These imply that the trade liberalization and effective education planning strategy have had significantly contributed to the development of Malaysian economy.

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